

Claims 16, 17, 18, 19, 20 and 21, line 2, change "up to about 360" to
--350 to 370--.

62 23. (Amended) The activated alumina catalyst as defined by Claim 1, comprising
beads having pore volume of alumina of pores of diameter greater than 0.1 [Nm] μm of
18.5 ml/100g and pore volume of pores of alumina of diameter greater than 1 [Nm] μm of
15.5 ml/100g.

REMARKS

Reexamination and reconsideration of the application identified in caption, as
amended, pursuant to and consistent with 37 C.F.R. § 1.112, and in light of the remarks
which follow, are respectfully requested.

The various issues raised in the November 2, 1998 Official Action are discussed in
the order in which they appear in the Official Action.

The §112, ¶1 Rejection

Claims 16-21 were rejected under 35 U.S.C. §112, first paragraph, for the reasons
set forth on page 2 of the Official Action. In the Official Action it is alleged that the
specification "does not reasonably provide enablement for a specific surface area which is
lower than 350 m²/g" and that the specification is enabling for a specific surface in the
range of 350 to 370 m²/g (Official Action at page 2). However, the specific surface
referred to in the Official Action relates to that of alumina in Example 2 of the
specification. Other portions of the specification disclose that the catalyst can include
materials other than alumina in amounts up to 40% (see specification at page 4, line 18

through page 5, line 6). Although Applicants do not acquiesce in the rejection, Claims 16-21 have been amended to recite the 350 to 370 m²/g range.

The §112, ¶2 Rejection

Claims 1-23 stand rejected under 35 U.S.C. §112, second paragraph for the reasons set forth on page 3 of the Official Action. Although the rejection is respectfully traversed on the basis that it is clear from the specification what is meant by “cocatalytically effective amount” and/or the specific recitation of a range for the “effective amount”, a clarifying amendment has been made to Claim 1 which now recites that the amount is effective for conversion of CS₂. Further, Claim 23 has been amended to correct a typographical error, i.e., change “Nm” to --μm--. Accordingly, withdrawal of this ground of rejection is respectfully requested.

The §103 Rejection

Claims 1-21 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Goodboy in view of U.S. Patent No. 5,244,648 ("Dupin") or U.S. Patent No. 3,856,708 ("Carithers"). This rejection is respectfully traversed for the following reasons.

Legal Standard For Overcoming §103 Rejections

In In re Baird, 29 USPQ 2d 1550 (Fed. Cir. 1994), the court stated that “[t]he fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious.” Also, evidence of unexpectedly good results can overcome a rejection based on optimization of a “result effective variable” provided the

unexpected results are established by factual evidence. In re DeBlauwe, 222 USPQ 191, at 196 (Fed. Cir. 1994). With respect to optimization, in In re Antonie, 195 USPQ 6, 8 (CCPA 1977), the court stated that:

The PTO and the minority appear to argue that it will always be obvious for one of ordinary skill in the art to try varying every parameter of a system in order to optimize the effectiveness of the system even if there is no evidence in the record that the prior art recognized that particular parameter effected the result. As we have said many times, obvious to try is not the standard of 35 U.S.C. §103. (Emphasis in original.) Antonie, at 8.

The court in Antonie also stated that while the discovery of an optimum of a variable in a known process is normally obvious, there are two exceptions to the rule. The first exception is when the results of optimizing a variable, which was known to be result effective, were unexpectedly good. The second exception is in the case where the parameter optimized was not recognized to be a result-effective variable. In the present case, while Goodboy provides no recognition that low Na₂O contents would be effective in providing improved CS₂ conversion rates, the Nedez Declaration submitted with the Amendment filed May 28, 1998 shows that the claimed Na₂O range produces unexpected improvement in CS₂ conversion in comparison to the closest examples (interpolated using Attachment I of the Nedez Declaration) of Goodboy. ✓

Goodboy states that increased sulfur conversion can be obtained using an activated alumina catalyst in which sodium oxide concentration, LOI (hydroxyl content determined by heating from 400° to 1100°C) and surface area are controlled (column 3, lines 17-21

and 31-32 of Goodboy). Goodboy discloses a broad range of 0.1 to 2.5 wt % sodium oxide but prefers 0.50 to 2.5 wt % on a 1000°C calcined basis (column 3, lines 57-60 of Goodboy). Goodboy teaches away from low sodium oxide contents at column 4, lines 18-35 wherein it is stated "low sodium oxide content was believed to be desirable...[but contrary] to this expectation, significant amounts of sodium oxide are not only tolerable to a Claus catalyst, but , in fact, are beneficial . . ."

Goodboy's Examples 1-9 show a conversion rate of "S" of 79.1 to 82.9% for Na₂O contents of 0.44, 1.36, 0.43, 0.41, 0.09, 2.10, 0.10 and 0.33 wt % (1000°C Basis) according to Table I of Goodboy. Such results would be plotted as an essentially flat curve, the conversion rate of 0.09 and 0.10 wt % Na₂O being essentially the same as that of the 0.33 wt % and above Na₂O contents. Further, it is noted that Goodboy measured SO₂ chemisorption rather than conversion of CS₂.

It is well established that the unexpected discovery of improved results for a limited range within a broader range merits patent protection. See Baird, supra. In view of Goodboy's preference for Na₂O contents in amounts of 0.5% and above and Goodboy's data showing essentially the same conversion rate for Na₂O contents of 0.09 to 2.10%, the skilled artisan would not have expected low Na₂O contents to produce the dramatic improvement in CS₂ conversion discovered by Applicants. It is submitted that Applicants' showing of unexpected improvement in CS₂ conversion rates for the claimed range of 0.12 to 0.25% Na₂O rebuts any prima facie case of obviousness based on Goodboy.

The Nedez Declaration includes Attachment I wherein CS₂ conversion is plotted with respect to various Na₂O contents in a gas-catalyst prepared according to the process set forth in paragraph 2 of the Nedez Declaration. Attachment I shows the interpolated data corresponding CS₂ conversion rate for the closest Na₂O examples of Goodboy compared to the claimed 1,200 to 2,500 ppm Na₂O range (see paragraph 7 of the Nedez Declaration). Attachment I shows that the claimed 1,200 to 2,500 ppm Na₂O content provides new and unexpected results with respect to CS₂ conversion compared to Na₂O contents above and below the claimed range.

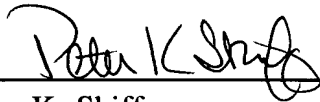
In the Official Action, it is stated that Goodboy discloses "improved Claus catalyst made from activated alumina and sodium oxide . . . the catalyst possesses . . . higher catalytic activity with respect to compounds such as . . . CS₂ . . ." (Official Action at page 8). Further, while it is acknowledged that "a catalyst is unpredictable" it is argued in the Official Action that "sodium oxide is a recognized result-effective parameter" (Official Action at page 8). Finally, the Official Action argues that a skilled artisan "would reasonably expect that within the . . . sodium oxide concentration taught by Goodboy an optimum concentration for catalytic activity with respect to CS₂, H₂S, SO₂ and COS would differ for each" (Official Action at page 9). However, in view of Goodboy's Examples 1-9 wherein SO₂ conversion is essentially the same (79.1 to 82.9%) for all Na₂O contents in the range of 0.09 to 2.10 wt % Na₂O, it is submitted that one of ordinary skill in the art would not have expected to find an "optimum" concentration of Na₂O based on the teachings of Goodboy. Besides, whether or not the effect of Na₂O is a recognized result effective

variable, unexpectedly improved results for a recognized result effect variable can overcome a prima facie case of obviousness. See Antonie, supra.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited.

Respectfully submitted,

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Date: March 16, 1999